

1-3. (Cancelled)

4. (Currently amended) ~~The mass spectrometer of claim 3, wherein A~~  
mass spectrometer, comprising:

a sample chamber configured to receive a number of samples for mass spectral analysis, the sample chamber adapted to be evacuated to a first pressure,

an ionization chamber secured to the sample chamber, the ionization chamber adapted to be evacuated to a second pressure less than the first pressure, and

a gate valve having a door, the gate valve being interposed between the sample chamber and the ionization chamber, the door of the gate valve being positionable between an open position and a closed position, wherein (i) when the door is positioned in the open position the sample chamber is in fluid communication with the ionization chamber and (ii) when the door is in the closed position the sample chamber is substantially in fluid isolation from the ionization chamber, a sample substrate having a number of samples disposed thereon, the sample substrate positioned in the sample chamber when the door is positioned in the closed position, and a portion of the sample substrate positioned in the ionization chamber when the door is positioned in the open position, the sample substrate comprising a tape having a first end thereof secured to a supply reel and a second end thereof secured to a take-up reel, and both the supply reel and the take-up reel positioned in the sample chamber, a portion of the tape between the supply reel and the take-up reel is positioned in the ionization chamber when the door is positioned in the open position.

5-9. (Cancelled)

10. (Currently amended) A MALDI mass spectrometer, comprising:

a sample chamber,

an ionization chamber, and

a valve positioned between the sample chamber and the ionization chamber, the valve being operable between (i) an open valve position in which the sample chamber is in fluid communication with the ionization chamber, and (ii) a closed valve position in which the sample chamber is isolated from the ionization chamber,

a sample substrate adapted to have a number of samples disposed thereon, the sample substrate positioned in the sample chamber when the valve is positioned in the closed valve position, and a portion of the sample substrate adapted to be positioned in the ionization chamber when the valve is positioned in the open valve position, the sample substrate comprising a tape having a first end thereof secured to a supply reel and a second end thereof

secured to a take-up reel, both the supply reel and the take-up reel adapted to be positioned in the sample chamber, and a portion of the tape between the supply reel and the take-up reel adapted to be positioned in the ionization chamber when the valve is positioned in the open valve position.

11. (Original) The MALDI mass spectrometer of claim 10, further comprising a vacuum system, the vacuum system being operable to maintain the ionization chamber and the sample chamber at different pressures.

12. (Original) The MALDI mass spectrometer of claim 11, wherein the vacuum system is operable to maintain the ionization chamber at a lower pressure relative to the sample chamber.

13. (Original) The MALDI mass spectrometer of claim 11, wherein the vacuum system is operable to maintain the ionization chamber at a lower pressure relative to the sample chamber when the valve is positioned in the closed valve position.

14. (Original) The MALDI mass spectrometer of claim 11, wherein the vacuum system is operable to maintain the ionization chamber at a lower pressure relative to the sample chamber when the valve is positioned in the open valve position.

15-22. (Cancelled)

23. (Currently amended) A method of performing mass spectral analysis, the method comprising the steps of:

positioning a number of samples for mass spectral analysis in a sample chamber, the positioning step comprising disposing the number of samples on a tape,

evacuating the sample chamber to a first pressure subsequent to positioning the number of samples therein,

subjecting the number of samples positioned in the sample chamber to the first pressure for a time period, and

advancing the number of samples from the sample chamber to an ionization chamber after the time period, the advancing step comprising advancing the tape to the ionization chamber, wherein the ionization chamber has a second pressure therein that is less than the first pressure.

24. (Cancelled)

25. (Currently amended) The method of claim 24 23, wherein advancing the tape to the ionization chamber comprises advancing the tape from a supply reel positioned in the sample chamber to the ionization chamber.

26. (Currently amended) The method of claim 24 23, wherein advancing

the tape to the ionization chamber comprises advancing the tape from a supply reel positioned in the sample chamber, through the ionization chamber, and onto a take-up reel positioned in the sample chamber.

27-28. (Cancelled)

29. (Currently amended) A method for performing mass spectral analysis, the method comprising the steps of:

disposing a number of samples for mass spectral analysis onto a substrate tape, wherein the disposing of the number of samples onto the substrate tape occurs under atmospheric pressure,

positioning the number of samples in a sample chamber,  
evacuating the sample chamber to a first pressure subsequent to positioning the number of samples therein,

subjecting the number of samples positioned in the sample chamber to the first pressure for a time period, and

after the time period, advancing the ~~number of samples tape~~, one sample at a time, from the sample chamber to an ionization chamber ~~after the time period~~, wherein the ionization chamber has a second pressure therein that is less than the first pressure.

30. (Cancelled)

31. (Currently amended) The method of claim 30 29, wherein advancing the tape to the ionization chamber comprises advancing the tape from a supply reel positioned in the sample chamber to the ionization chamber.

32. (Currently amended) The method of claim 30 29, wherein advancing the tape to the ionization chamber comprises advancing the tape from a supply reel positioned in the sample chamber, through the ionization chamber, and onto a take-up reel positioned in the sample chamber.

33. (Currently amended) A MALDI mass spectrometer, comprising:  
a vacuum system,  
a sample chamber in fluid communication with the vacuum system, the sample chamber being evacuated to a first pressure by the vacuum system,  
an ionization chamber in fluid communication with the vacuum system, the ionization chamber being evacuated to a second pressure by the vacuum system, the second pressure being less than the first pressure, and  
a gate valve having a door, the gate valve being interposed between the sample chamber and the ionization chamber, the door of the gate valve being positionable between

an open position and a closed position,

wherein (i) when the door is positioned in the open position the sample chamber is in fluid communication with the ionization chamber and (ii) when the door is in the closed position the sample chamber is substantially in fluid isolation from the ionization chamber,

a tape having a number of samples disposed thereon, the tape having a first end thereof secured to a supply reel and a second end thereof secured to a take-up reel, both the supply reel and the take-up reel positioned in the sample chamber, and a portion of the tape between the supply reel and the take-up reel adapted to be positioned in the ionization chamber when the door is positioned in the open position.

34-41. (Cancelled)